JPRS L/10421

29 March 1982

Worldwide Report

TELECOMMUNICATIONS POLICY, RESEARCH AND DEVELOPMENT

(FOUO 7/82)

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APPROVED FOR RELEASE: 2007/02/09: CIA-RDP82-00850R000500040067-9

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CONTENTS

JAPAN

NTT SATELLITE PROJECT TO FACE OPPOSITION

OW041215 Tokyo ASAHI EVENING NEWS in English 3 Mar 82 p 3

[Text] Nippon Telegraph and Telephone [NTT] Public Corporation has decided to put two massive business communication satellites into orbit by 1992.

But the plan seems likely to run into opposition from the Space Development Committee headed by Science and Technology Agency chief Ichiro Nakagawa over plans to use America's space shuttle instead of domestically produced rockets.

NTT will launch a one-ton satellite similar to America's successful INTELSAT in 1988 to handle the mounting flood of international business communications. While the satellite would contain some 10,000 telephone circuits, it would be a baby compared to the second stage of the project: a four-ton giant that could simultaneously handle 100,000 circuits. It would be launched in 1992.

NTT will debate the proposal further with the Ministry of Posts and Telecommunications and other organizations before taking it to the space committee this summer.

But the summer presentation is not likely to be a rubber-stamp affair.

One of the basic goals of Japan's space program is to build up the country's technological capacity by using domestic technology. However, the H-1A, a three-stage liquid-fuel booster that is Japan's hope for the late 1980s, will only be able to put 550 kilograms into orbit.

That is far short of what would be needed for NTT's business satellites, leading the communication giant to decide that the cavernous cargo bay of the U.S. space shuttle is the only place where its satellites could fly into orbit.

The Space Development Committee already has plans of its own to launch two business communications satellites, the 350-kilogram CS-2, with 4,000 circuits, in fiscal 1982, and the 550-ton CS-3, with a 6,000-circuit capacity, in fiscal 1987.

NTT, however, says demand will far outstrip the limited capacity of the CS series, which it labels uneconomical. It is going ahead with its plans, and has already established a research section for the giant satellites.

"Satellite communications once had an image of being used during disasters, or for communicating with distant islands," NTT official Koji Maeda said. "Satellite communications also cost more than ground-based communications.

"NTT has offered as inexpensive a service as possible, which is why we thought of using the space shuttle at less than a third the cost of domestic rockets."

A spokesman at the Space Development Committee offices in the Science and Technology Agency said recently that NTT had yet to contact the committee directly. But he warned that any plan to use the space shuttle would run counter to the Japanese space program's policy of using domestic technology.

CSO: 5500/2142

INTERNATIONAL AFFAIRS

L-SAT TO PROVIDE HIGH PAYLOADS, WIDE COVERAGE, MANY USES

Paris AIR ET COSMOS in French 23 Jan 82 pp 40-43

[Article by Pierre Langereux: "The ESA Is Preparing the Most Powerful Telecommunications Satellite"]

[Excerpt] The ESA [European Space Agency] has undertaken the construction of the world's most powerful telecommunications satellite: The L-SAT [Large Satellite], a large experimental high-frequency telecommunications and direct TV satellite, which will also be the largest satellite ever built in Europe. This satellite's dimensions (a span of from 25 to 46 meters), its weight (2.4 to 4.3 tons) and its power (from 3.5 kW to more than 7.8 kW) will surpass anything that has been built until now, even the largest and most powerful American satellites.

The L-SAT program has as its dual objective the development of a large multipurpose platform--of the Ariane-3 or -4 class (2.4 to 3.4 tons) or equivalent Shuttle --suitable for most future telecommunications and direct TV missions, and the launching in early 1986 of a first L-SAT 1 experimental satellite that will enable the in-orbit testing of several European payloads intended to stimulate the interest of potential users and promote new commercial missions, by way of a complete demonstration and operational program.

Large Platform

L-SAT has thus been conceived as a multipurpose platform capable of adaptation to a large variety of telecommunications and direct TV uses requiring payloads in excess of 500 kg and powers of over 2.5 kW during solar eclipse and over 7 kW during solar illumination.

This L-SAT platform is intended to accommodate the building of the four principal classes of telecommunications satellites of the 1990's, namely: satellites of the semi-Ariane-3 or Shuttle-PAM-D class, satellites of the full-Ariane-3 or Shuttle-class with perigee motor, satellites of the semi-Ariane-4 (or full-Ariane-2) or Shuttle-PAM-A class, and satellites of the full Ariane-4 or Shuttle-IUS class.

L-SAT will therefore be the platform of the future Ariane-4 launcher satellite which will be capable of placing 2- to 4.3-ton satellites in synchronous transfer orbit beginning in 1986

The platform will be stabilized about three axes in transfer and earth-synchronous orbits, and designed for mission durations of 10 years. The general architecture of the platform, which will consist essentially of three parts (on-board utilities module, propulsion module, and telecommunications module), is flexible enough to accommodate the different missions being anticipated. The satellite's hull, in the form of a parallelepiped (1.75 x 2,10 x 3.50 meters), is dimensioned as a function of the Ariane-3 and -4 shrouds (3 and 4 meters in diameter). It is also designed to carry the telecommunications antennas (nondeployable), 2 to 3.5 m in diameter, on the east and west sides of the parallelepiped. This is so as to avoid the need for an antenna-support mast, which would increase the congestion beneath the shroud. The north and west sides of the hull carry the telecommunications equipment (power amplifiers) and heat-loss panels (consisting of heat-sinks) having a total surface area of 9 m^2 and capable of dissipating up to 4.5 kW of energy not used up by the on-board equipment (allowing for the efficiency of the amplifiers). The satellite's electric power supply--utilities and payload--is provided by a a large, non-rigid solar generator (deployable on an "astromast") of the silicon photocell modular-network type, which is constantly oriented toward the sun. This generator is made up of two large panels of photocells that can be deployed in parallel to furnish up to 3 kW in transfer orbit, or fully deployed in earth-synchronous orbit to deliver a maximum power of over 7.8 kW at the end of its service life (10 years). Its maximum power in eclipse can reach over 3.6 kW with 35- or 50-ampere-hour nickel hydrogen batteries. Its electrical energy output is distributed to the satellite by a regulated direct-current (50-volt) bus for high-power equipment (amplifiers) and by an alternating-current bus for low-power equipment (utilities, etc). The remote control and telemetering system utilizes a central data-processing unit connected sensors distributed along a bus.

Another feature of the L-SAT platform is its use of an integrated liquid-bipropellant propulsion system for its injection into earth-synchronous orbit (apogee motor), as well as for orbit and attitude control throughout the service life of the satellite, regardless of its mission: Only the quantity of propellants (liquids) contained in the tanks is varied, as well as the attitude- and orbit-control system software (in accordance with the weight of the satellite). This propulsion system is contained in a cylindrical tube located at the center of the structure. Attitude and orbit control is effected by means of a conventional 3-axis stabilizing system, including gyroscopes for yaw control and four inertial wheels for the control of roll and pitch all associated with infrared sensors or radio markers and commanded by a central microprocessor unit. The platform's aiming accuracy is thus held to within approximately 0.1 degree, with its antennas also equipped with an automatic vernier-aiming device.

L-SAT 1 Satellite

The ESA program provides for the building, on this basis, of a first L-SAT 1 experimental satellite to be launched at the beginning of 1986 in geostationary orbit by 19 degrees West using an Ariane 3 rocket (or the Shuttle). This satellite weighing 2.4 tons at launching, of which 1.2 tons is propellants (liquids) for its maintenance in service over 7 years, will be equipped with a 3.3-kW solar

generator (power consumption 3 kW), imparting to L-SAT 1 a span of over 26 meters. Three developmental models of the satellite (structural, thermal and electrical) will be built, as well as a qualification-test model which will in fact be the first flight model. A second flight model is to be built and partially integrated before the first launching, so as to be available for injection into orbit, should this be necessary, 1 year after L-SAT 1.

Four experimental payloads will be carried aboard L-SAT 1 on this first demonstration and new services promotion mission.

An 11.7-12.5 GHz (reception at 17-18 GHz) direct-TV payload, designed and built by Selenia (Italy), will consist of two TOP [progressive wave tube] 230-watts-each channels (PIRE [expansion unknown] 61 dBW) and beam antennas of 1.6 x 1.6 degrees an 1.0 x 2.4 degrees. One of these channels will be dedicated to a pre-operational direct TV service over Italy (see AIR ET COSMOS No 874); the other channel will provide European coverage and will be used particularly to transmit experimentally a single TV program throughout all of Europe, as has been suggested by a number of EBU [European Broadcast Union] countries.

A 12-14 GHz "specialized services" payload, designed and built by Marconi (Great Britain), will be used to extend or improve commercial leased circuit facilities that will be put into service between now and then with EUTELSAT's [expansion unknown] European ECS [expansion unknown] satellites and the French DGT's [General Directorate for Telecommunications] Telecom 1 satellites. These links with L-SAT 1 will use small terrestrial terminals with 3-meter or lesser diameter antennas; the satellite will cover all of Europe using a multibeam antenna with five 1.3-degree "spots" (PIRE 45 dBW) and time-division multiple access [SS-TDMA].

A 20-30 GHz telecommunications payload, also furnished by Selenia, and using two transmitting-receiving antennas 1 meter in diameter (one a single-beam and the other 0.6-degree dual "spot"), will provide demonstration of various types of higher-frequency services: Video-conferences (point-to-point or multipoint) digitalized at 8.44 Mbits/sec throughout Europe; tele-education (to multiple addressees) via digital or analogue links (video and sound) over a limited zone; data and video transmissions (digital) at 2.048 Mbits/sec over Western Europe; and wideband transmissions of closed-circuit signals over one station.

A 12-GHz, 20-GHz and 30-GHz propagation payload, designed and built by Bell Telephone Manufacturing (Belgium), will be used for propagation tests (amplitude and frequency stability, quality of polarization) over Europe with these new frequencies that have not yet been used operationally (except for 12 GHz). A group of some 40 organizations will take part in these experiments, which are aimed at establishing a propagation model (attenuation and depolarization of the signal, etc). The 12-GHz (unmodulated) signal will also be used for tracking the satellite by the control station.

The L-SAT 1 platform will be built by some 40 firms under a British Aerospace prime contract; British Aerospace itself will build a portion of the hull, the deployment mechanisms and the attitude control. The principal contractors will be Fokker (Netherlands) for the essential bus assembly, Aeritalia (Italy) for the

thermal control system, and Spar Aerospace (Canada) for the solar panels. Spar Aerospace will also participate in the final assembly of the satellite in Canada, at the Canadian Telecommunications Research Center's new David Florida Space Simulation Center.

This new program will rank British Aerospace among the leading European builders in the field of telecommunications and direct TV satellites, and a rival of the Franco-German Eurosatellite group with regard to large platforms. British Aerospace has in fact already participated in the European OTS [expansion unknown], ECS and MARECS [expansion unknown] programs and has just been awarded a contract for the British Skynet 4 military telecommunications satellite. It is also clear that British Aerospace will be the leader of the industrial consortium that will build the British direct TV satellite if this program is adopted, which it very probably will be.

L-SAT Market

Market studies carried out in 1979-1980 indicated a total of around 150-200 satellites to be launched during the periods 1986-1994 or 1986-2000, of which more than 110 would be of the L-SAT class, for the market that is "open" to international competition, that is, the market outside the USSR, the United States and Japan (see table). According to estimates, European industry could "reasonably" expect to provide 20-30 satellites (ESA estimate), possibly even more than 40 satellites (British Aerospace estimate), of the L-SAT type of this total market requirement, which is estimated to be worth 5 billion pounds sterling. These estimates do not seem unrealistic if one considers that the European market alone now represents 26-34 satellites (according to the ESA).

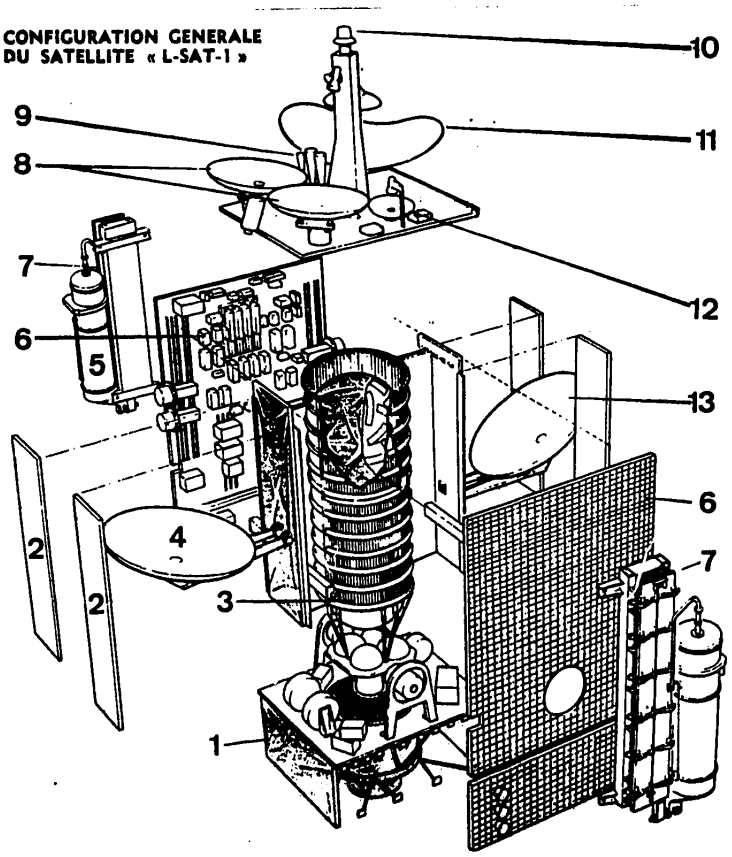
A more recent analysis (July 1981) has furthermore identified a certain number of potential missions for L-SAT: A second-generation successor to EUTELSAT's ECS satellites (enabling accommodation of a 10 percent per annum increase in traffic until 1997); intercity links (high traffic density) for Italy; intra-European commercial links (data transmission and video-conferences); direct TV service for small European countries (Switzerland Luxembourg); direct TV service to Canada (over six zones); an augmented-capacity "INTELSAT 6" satellite (B7 version) for intercontinental links; etc.

Two applications in particular have been studied: Direct TV to Canada using an L-SAT satellite (326-kg payload, 5.8 kW of power) equipped with 36 TOP-type, 40-W (18-MHz bandwidth) repeaters and a 1.8 x 2 meter antenna; and direct TV over Switzerland and Luxembourg using an L-SAT satellite (280-kg payload, 3.7 kW of power) equipped with two groups of TOP-type 50- and 100-W (27-MHz bandwidth) repeaters , a 1.0 x 2.6 antenna for Switzerland, and a 1.0 x 3.1 m antennna for Luxembourg.

According to British Aerospace, the cost of such systems, using L-SAT satellites, would come to around 140 million pounds sterling--approximately 1.4 billion francs--of which 70 million pounds would be for the development and construction

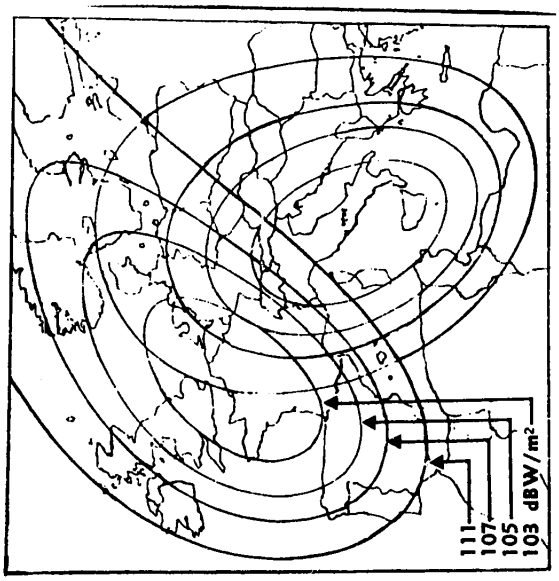
of two satellites, 50 million pounds for the launchings (Ariane rockets) and 20 million pounds for a flight model in reserve on the ground. For the two mentioned cases, this would work out to a cost of 4 million pounds sterling per channel for Canada (36 channels) and 14 million pounds sterling per channel for Switzerland and Luxembourg (10 channels).

General Configuration of L-SAT 1 Satellite

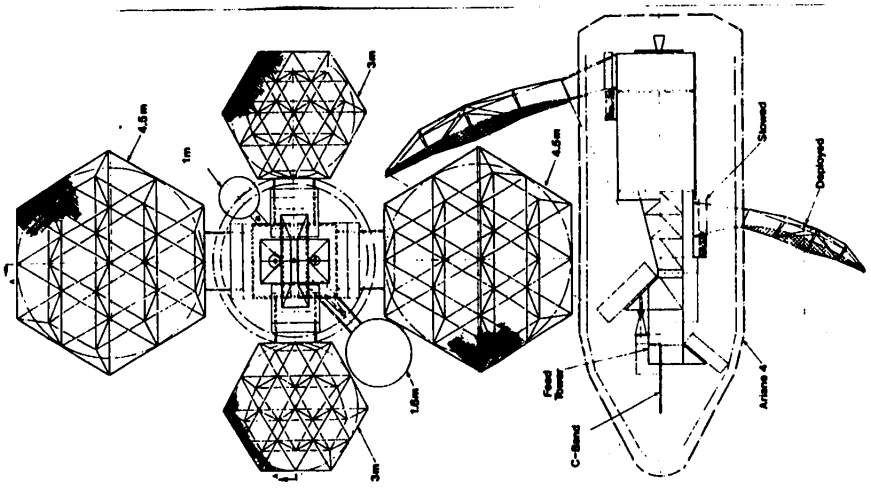


Key:

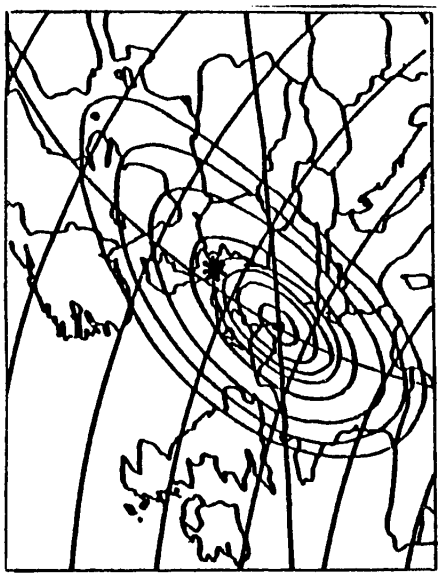
1. Utilities module. 2. Structural panels. 3. Propulsion module. 4. TV transmitting antenna. 5. Solar generator deployment mechanism. 6. Telecommunications equipment (TOP, etc). 7. Solar generator (folded back). 8. 20-30 GHz antennas. 9. 12-20-30 GHz markers. 10. TV receiving antenna. 13. [as published] Specialized services antenna.

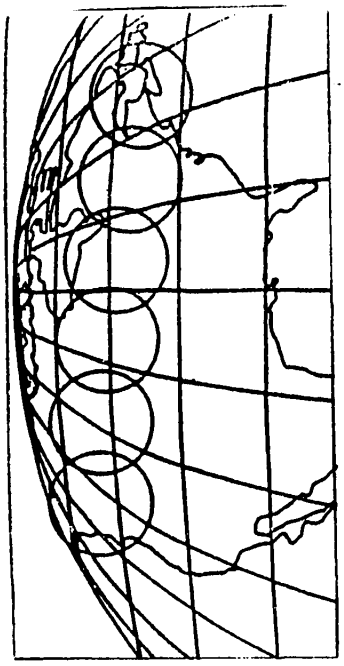


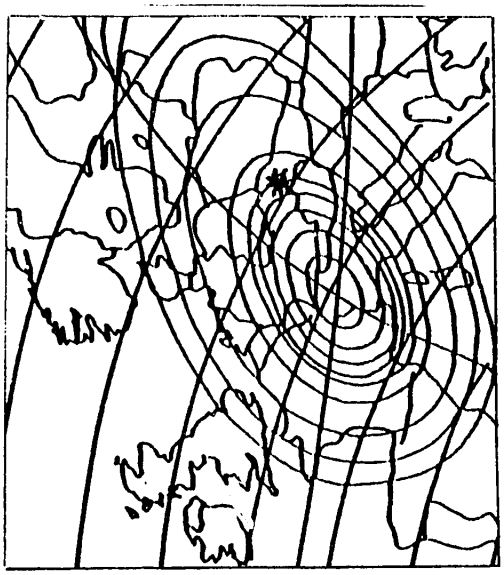
European coverages with L-SAT 1 at different receiving levels (103-111 dBW/m2), using 0.9-m to 2.0-m diameter antennas.



Antennas that can eguip the L-SAT platform and be stowed under Ariane-3 and -4 shrouds.





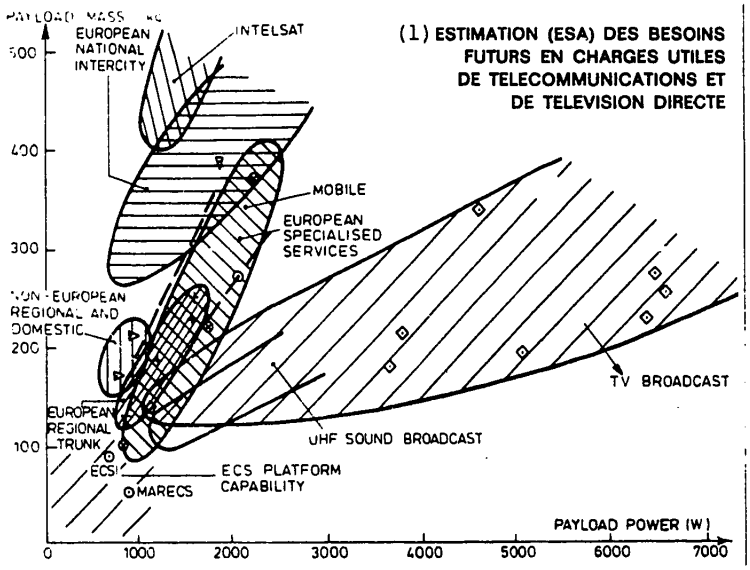


Coverages Using L-SAT Type Satellite

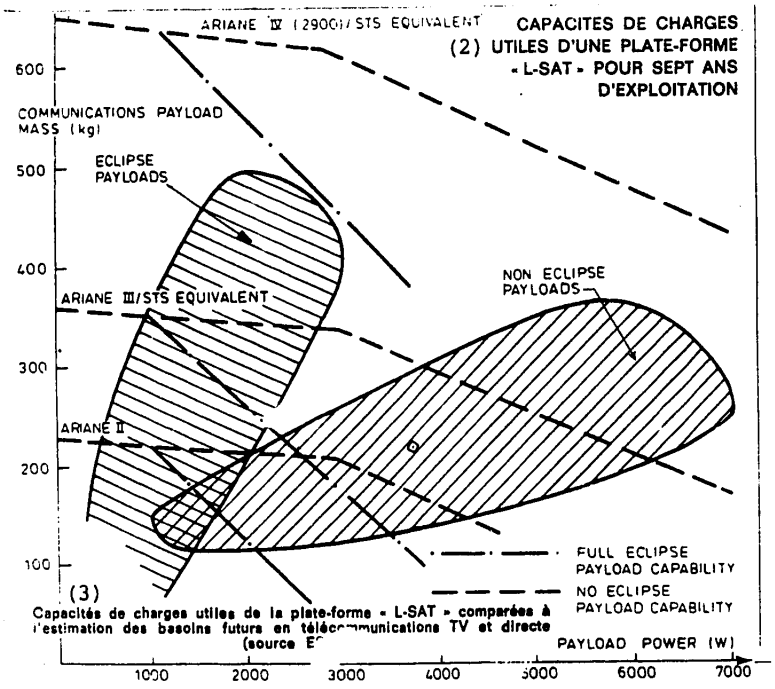
Upper left: Switzerland.

Upper right: Luxembourg.

Lower right: Canada.



(1) Estimate (ESA) of future telecommunications and direct TV payload requirements.



(2) Payload capacities of L-SAT platform for 7 years of operation.

(3) Comparison between L-SAT platform payload capacities and estimated future telecommunications and direct TV requirements. (Source: ESA).

'Open' Market for Large Satellites and L-SAT Share

(1) Estimations	(2) Marché 1986 à...		(3) Dont L-SAT »
	1994	2000	
Marché total (4)			
Future Systems (USA)	119	203	—
ESA (Europe)	113	—	20-30
British Aerospace (G.-B.)	—	150	42
Marché européen (5)			
ESA	26	34	26-34

Key:

1. Estimates.
2. Market from 1986 to:
3. L-SAT share.
4. Total market.
5. European market.

9238
CSO: 5500/2095

SIP'S PRESIDENT ON DEVELOPMENT OF TELEPHONE SERVICES

Milan IL MONDO in Italiam 15 Jan 82 pp 38-39

[Interview with Ottorino Beltrami, president of SIP, vice president of STET, by Ettore Mazzotti: "The Private Investor Must Answer"; date and place of interview not given.]

[Text] "Telecommunications, and telephones in particular, together with housing, will act as the shuttlecock for the economic recover we are all awaiting." This is what Ottorino Beltrami has promised, and as president of SIP [Italian Telephone Company] and vice-president of STET [Telephone Finance Corporation], he is the person who bears the largest share of responsibility for the management of phone service while simultaneously determining policy for those companies which manufacture phone equipment. Beltrami is also a manager who is prepared to sacrifice development programs in favor of balanced management and proper financial management for his companies. On the other hand, the situation he inherited from SIP (over 6,500 billion lire in the red by the end of 1980, double the intake figures) appears to go in the direction of amortizing the development of telephone service. Telecommunications companies also are having a rough time, with Italtel serving as a prime example of this. This company, which is owned by STET, is Italy's leading producer of telephone sets. It lost over 300 billion lire in two years and plans to lay off some several thousand employees. With the above in mind, national industry has to face competition from the likes of multinationals such as ITT. Therefore, what is Beltrami's optimism based on? He explains this himself in this interview with IL MONDO.

Question: What will short and medium term new telecommunication development have on Italian economy?

Answer: Just a few data are needed to provide a picture of the possibilities open to the national economy through the development of telecommunications, and of telephone service in particular. In five years, for telephone related matters, we foresee an investment of 21,180 billion lire. If one then applies the multiplication factor to these investments a much higher sum is realized, which then guarantees the development and employment of a business sector which between management, manufacture and distribution counts upwards of 300,000 employees.

In the same 5-year period, 4.5 million new customers are expected, of which over one million are to be business accounts.

To these figures I add two other considerations to aid and better define the leadership effect telecommunications development has. First of all, the possibility of providing advanced technologies to our country: in addition to the new telematic services, there are the diffusion of electronic commutation (1,450,000 units by the end of 1986) and optical fiber transmission (20,000 kilometers of fiber). Secondly, a better qualified staff. Today SIP has over 70,000 employees. In 5 years there will be fewer generalists and more specialists, technicians and engineers. In short, again thanks to the phone, the technological gap between Italy and the other more advanced countries will be lessened.

Question: What are the main objectives of the five-year plan presented by SIP to the Ministry of Posts and to State Shareholdings.

Answer: In brief, they are five: upgrading of basic telephone equipment coupled with improved service; improvement of the company's public image and its overall telephone service; expansion of new services; a motivating thrust for electronic industries at the national level; and the attracting of new capital from private investors. A goal of singular importance is that involving the investor's trust. Our plans include up to 30 percent of the social capital to be contributed by private investors beginning in 1984. In order to obtain this goal, it is necessary to rekindle the sense of trust in the SIP company via the balance of economic management, improvement of financial programs, equal distribution in wages from social capital during the current year, and improvement of relations with the consumer as a result of actions aimed at bettering service and the company's image.

Question: How will the investments foreseen by SIP be distributed?

Answer: It is not possible to give an accurate account of which funds will be used for the different types of clients inasmuch as, for example, main plants and networks service both family and business accounts. I am able to say that our attention regarding business accounts is being underscored by earmarking the sum of over 1,700 billion lire (over 8 percent of the total) during the five-year plan for investments in telematic services as well as user systems.

Since 1981 prices (and taking into account the hypothesis of an ever increasing committment) the primary sources of investment in the 3-year period from 1982 to 1984 are, in billions of lire:

Customer Units	151	152	153
Main Offices	978	1027	1104
Urban and Sector Networks	859	890	908
Long Distance Network	214	230	240
Buildings/Offices	190	180	170
Data Processing, new services, etc.	218	251	285
Totals	2610	2730	2860

Question: From a price/quality perspective, is providing Italian electronic equipment [to the market] competitive with foreign equipment?

Answer: In general, we feel that Italy's industrial position is competitive. Many companies export their products, which is proof of their quality and competitiveness. Naturally, regarding costs, Italian industry is beset by significant problems due to their having to sustain, unaided, all costs directed to research and development. It is now necessary that legislation be passed which calls for quick procedures in order to come to the aid of researching financing.

Question: Italian manufacturing companies state that they will be able to produce electronic telephone connections and have a balanced budget if the market will absorb beginning in 1982, one million lines per year. From known data, SIP foresees at the very most, in 1982, the installation of 850,000 lines for a total investment of 3,000 billion lire. Who is to be sacrificed?

Answer: I don't believe the first concern of the manufacturing companies is the number of lines produced as much as the cost/profit ratio. Nevertheless, we are not far removed from the figures you mentioned. Our 1982 plans call for an outlay of 3,050 billion lire which will allow us ultimately to service 850,000 new customers. In 1983 we plan an increase of 880,000 new customers, 900,000 for 1984, as well as that same figure for both 1985 and 1986. By that time, there will be an average 31 customers per 100 inhabitants and 72 percent of all families will have phone service, compared to 54 percent at the end of 1980. Our long-range goal is to reach, by 1990, 100 percent of the people in order to provide them with phone service.

Question: Does SIP intend to recognize a "political price" of Italian goods, namely prices that take account of disparities in the production of phone equipment?

Answer: We can categorically state that we never engaged in preferential treatment, above all to the detriment of quality. The relationship between SIP and the industrial sector is the same as the one usually found between producer and purchaser. The same can be said for price policy.

Question: Why does SIP deem it necessary to restrict the distribution of new electronic systems for phone services while at the same time it encourages the presence on Italian markets of foreign enterprises such as CIT ALCATEL?

Answer: SIP has always been concerned with employment problems, with foreign industries on Italian soil and those companies working under foreign license. A company such as ours cannot allow itself any illusions of monopoly due to the fact that in our sector, the quality of service and the balance between profits and costs are closely linked to technological development, which does not know national boundaries. In addition, we must protect the interests of our customers as well as the country's economy by keeping up to date and knowing and even experimenting with that which is done abroad.

Question: In what manner will the financial backing be drawn up for SIP's investment programs?

Answer: Financial backing for investment programs has, as a given, maintenance of the balancing fund at the same level, a franchise profit margin of 50 percent, and finally rate increases designed to maintain operational costs constantly in line with cash intakes.

The rate plan, however, can only function within the limits of the inflation ceiling if the provisions for rate increases are enacted promptly so as to avoid those gaps and debits that resulted in years past. (Rate increases are expected to be 10.2 percent for 1982 and 7.0 percent for 1983, effective 1 January of each year.)

As a result of a timely and constant rate modification, users will be able to benefit from a service of improved quality and decreased real costs. This will be possible thanks to a more dynamic use of incomes (by initiatives directed toward development of the traditional market and of new services) and by a more controlled increase in operating costs (by means of redesigned operational procedures and organizational structure proposed by SIP). Plans dealing with the financial-holding sector, on the other hand, have as a given, new infusions of risk capital and an easier access to the banking community for credit requests.

Question: In the development of telecommunications, is one of Italy's main goals the coming up to international standards, even at the risk of going abroad to acquire advanced systems, without developing its own native planning capability?

Answer: We are actively engaged in research and experimentation though we are also careful in maintaining our contacts abroad. Some of our suppliers belong to first level multi-national concerns.

Given this opportunity of first-hand comparison, our companies should in no way feel inferior. Furthermore, we have always supported the utilization and development of national telecommunications systems. Personally, I am most confident in the value of our research and development capacity and of the quality of our national production.

9209
CSO: 5500/2100

UNITED KINGDOM

PLANS FOR SATELLITES ANNOUNCED

PM021557 London THE FINANCIAL TIMES in English 2 Mar 82 p 10

[Report by Elaine Williams: "The Satellite Way to Europe"]

[Excerpts] By the end of 1983 British TELECOM plans access for UK companies to satellites for private business communications to Europe.

Services such as electronic mail, teleconferences, high speed computer data and even conventional telephone calls will be offered.

For organizations needing to send large volumes of information over long distances as quickly as possible satellites could be more convenient and cheaper than existing systems.

But in order to assess the potential of such a service, British TELECOM has plans to run 12 trials this year. Small dish aerials perched on office roof tops will transmit and receive digital data signals via the orbital test satellite, the forerunner to Europe's first communications satellite system.

THE FINANCIAL TIMES, however, was the first organization in Europe to cooperate with British TELECOM and Deutsche Bundesposte, the German telecommunications authority in running business trials on the orbital test satellite.

In November the satellite linked the FT's London headquarters to Frankfurt where the international edition is printed.

For two weeks complete facsimile pages of the newspaper were transmitted from London to Frankfurt for production and distribution by road and rail across Europe and by air around the world.

As well as demonstrating remote printing in Europe for the first time--an important milestone for the European newspaper industry--it showed the tremendous potential for businesses which need to transmit rapidly large volumes of information around the world.

The data signals representing words and pictures were transmitted from a small dish on the roof of THE FINANCIAL TIMES building, via the satellite to a small

dish provided by Dornier, the West German aerospace concern, at the company's printers in Frankfurt.

Originally, it had been hoped that the November trials would have involved transmitting pages of the newspaper to Stockholm, Paris and Rome, but administrative and minor technical problems prevented this.

As well as saving money, satellites could improve the service to readers and offer new types of services such as electronic mail for the newspaper--all applicable to any type of business.

British TELECOM expects that the total capital cost of providing a small dish satellite service in Europe will be about 100m pounds.

Agreement was reached two years ago to start the service after the launch of ECS, the first European communications satellite run by EUTELSAT and TELECOM 1, the French domestic satellite.

Coverage will range from the Shetlands to Gibraltar and from Sweden to Greece.

British TELECOM has already announced a link up with satellite business systems to allow UK customers access to the private system run by SBS throughout the U.S. by the end of this year.

CSO: 5500/2142 END